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China: Progress in Port Modernization

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Key Judgments

Information available as of 1 December 1982 was used in this report.

Large increases in foreign trade and changes in the composition of imports and exports continue to strain China's port facilities. As a result, China's leaders have placed port modernization high on their list of economic priorities. Port congestion, however, will continue to be a problem until the end of the decade.

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A major program begun in 1973 brought significant expansion of port capacity in the late 1970s, but capacity has grown little in recent years. There was, in fact, a near hiatus in initiation of new construction in the mid- and late 1970s. Now, however, a new effort to expand ports will, by 1985, increase the number of deepwater berths by one-third and provide added facilities to relieve port congestion.

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Modernization projects center around improving the flow of bulk commodities and specialized cargoes. The Chinese Government plans that its port facilities, which handled 160,000 containers in 1982, will accommodate six times that number by 1985. The capacity of China's coal-handling facilities is also planned to double by 1985. Grain- and oil-handling facilities are not now being expanded, because current capacity appears adequate for the next few years. Construction of fertilizer- and timber-handling facilities has fallen far short of expanding needs, but we have seen little evidence of efforts to remedy this problem.

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Inadequate inland transport networks also will limit the amount of cargo that Chinese ports can handle, particularly after port facilities are improved. Railroads now are working at or near capacity, and China lacks an effective long-distance highway network. A number of rail projects to improve the flow of goods to the ports are scheduled for completion by 1985. However, because China has no immediate plans for improving the highway sector, rails will have to continue to move the bulk of short-haul cargoes, which usually move by truck in more developed countries. Most of the increased rail capacity will be needed to accommodate rising domestic shipments and coal export commitments and will only marginally improve port service.

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China: Progress in Port Modernization

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Need for Port Modernization

In value terms, China's foreign trade has increased nearly ninefold since 1971 (see table 1). Although the increase is much less in terms of both real dollars and volume because of inflation and the shift toward trading higher value goods, it has caused widespread port congestion and has highlighted the weaknesses in China's port and transportation systems (see map at end).

The worldwide movement toward containerized transport, changes in regional patterns of coal output, and rapid increases in exports of fossil fuels and imports of grain have had a significant impact on China's ports. China's leaders have emphasized port modernization in their high-priority program to increase transport capacity.

Table 1 *Million US $*
China: Exports and Imports, f.o.b.

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	Total	Exports	Imports
1971	4,671.8	2,534.1	2,137.7
1972	5,821.5	3,234.6	2,586.9
1973	9,669.6	5,106.0	4,563.6
1974	13,483.7	6,759.0	6,724.7
1975	13,935.0	7,119.7	6,815.3
1976	12,835.4	7,270.0	5,565.4
1977	14,783.7	8,173.4	6,610.3
1978	20,488.6	10,159.6	10,329.0
1979	27,919.5	13,488.5	14,431.0
1980	38,249.4	18,910.2	19,339.2
1981	39,606.3	21,394.2	18,212.1
1982	41,200.0 [a]	23,400.0 [a]	17,800.0 [a]

[a] Estimate.

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Increases in Port Capacities

The Chinese have done much to modernize their harbors since the early 1970s, when they first realized that their ports were inadequate for handling large increases in foreign trade. Under a policy announced by Premier Zhou Enlai in 1973, the number of deepwater berths for oceangoing ships would be increased by port construction and dredging operations over three years, and turnaround time would be shortened by improved mechanized handling facilities. Moreover, China would build bulk cargo handling facilities and introduce limited container operations. Most of the projects did not become operational until the late 1970s

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Nevertheless, the volume of cargo handled at major seaports rose from 120 to 213 million tons between 1972 and 1979.[1] More than half of the increased volume occurred in 1978 and 1979 as a result of the completion of a number of projects begun in 1973. Subsequently, the growth rate for new port capacity dropped rapidly (see table 2).

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almost all of China's major ports, as well as many smaller ports, have been upgraded since 1979 and, in many cases, are still being expanded.[2] In addition, a few new ports have been built or are being built at river and coastal locations. Smaller ports handled about 90 million tons of cargo in 1980. About half this volume moved through ports controlled by the Chang Jiang (Yangtze River) Shipping Administration.

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[1] The Ministry of Communications lists 15 major ports: Basuo (Dongfang), Dalian (Luda), Haikou, Huangpu, Lianyungang, Ningbo, Qingdao, Qinhuangdao, Sanya (Yaxian), Shanghai, Shantou, Tianjin (Xingang), Yantai, Yingkou, Zhanjiang.

Table 2
China's Major Seaport Tonnage

Million metric tons

	1977	1978	1979	1980	1981	1982	1985
National [a]	159.69	198.34	212.57	217.31	219.31	232.00 [b]	317.00 [c]
Basuo		3.07	3.05		2.84		
Dalian		28.64	31.48	32.60	33.08		40.00 [c]
Haikou		0.76	0.83		0.79		
Huangpu		10.50	12.11	12.10	13.17		
Lianyungang		5.94	6.81		7.56		10.00 [c]
Ningbo			2.36		3.49		
Qingdao	11.70	20.02	18.02		18.10	20.50 [b]	
Qinhuangdao		22.19	24.08	26.38	26.55	28.00 [b]	60.00 [c]
Sanya		0.45	0.41		0.33		
Shanghai	73.00 [b]	79.55	83.50	84.70	83.35		150.00 [c]
Shantou		1.53	1.75		1.80		
Xingang		11.31	12.70	11.90	11.75		
Yantai		4.58	4.60		5.40		
Yingkou		0.33	0.25	0.24	0.26		
Zhanjiang		9.47	10.62		10.84		

[a] Total for the 15 major seaports under the Ministry of Communications.
[b] Estimate.
[c] Plan.

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New Facilities

China's 15 major ports have 331 berths, of which 144 are deepwater berths capable of handling ships of 10,000 deadweight tons (dwt) and above, according to the Chinese press. The Chinese still experience port congestion problems even though one-third of the deepwater berths were added since 1973.

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To accelerate cargo handling, the Ministry of Communications plans to begin construction of 132 new deepwater berths in coastal harbors by 1985. Of these berths, 54 are to be completed by 1985, adding 100 million tons of cargo capacity. According to NCNA—China's official news agency—port construction funds will be greatly increased between 1983 and 1985, and—by the year 2000—Chinese ports will contain 1,000 berths, of which 600 will be deepwater berths.

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Of the new coastal ports being built, Guangxi's Fangcheng port, with its two 20,000-ton and five 10,000-ton berths, was opened to trial operations early last year. This port, with a design capacity of 4 million tons of cargo annually, may well become the commercial outlet for southwest China. A new coal port, Shijiusuo, is under construction on the southern coast of Shandong Province. When complete, it will have China's third 100,000-dwt facility; the others are the oil wharf at Dalian and the Baoshan ore pier near Shanghai.

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In addition, port facilities are being built at China's newly established special economic zones (SEZs). A 100,000-dwt berth is planned for the Chiwan wharf at

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the Shenzhen SEZ near Hong Kong. Dongdu harbor, which is now under construction in the Xiamen SEZ, will have four berths with the largest capable of handling a 50,000-dwt ship. Smaller facilities are planned for Shantou SEZ in northern Guangdong Province, Zhuhai SEZ near Macau, and Shekou SEZ, also near Hong Kong. The full range of activities planned for these zones is not known, as the Chinese only recently began development. However, at Chiwan, which the Chinese may use as an offshore oil support base, a marine container factory recently started operations. We suspect that all of the SEZ harbors will have at least limited container-handling capabilities because many of the plants planned for these zones will be producing light industrial goods well suited for containerized shipments.

Construction activity also is directed toward increasing capacities of river ports, especially those handling coal. By 1985, China plans to double coal-handling capacity on the Chang Jiang (Yangtze) by extending dock areas and building larger berths. On the lower reaches of the river, coal berths for 10,000-dwt ships are being constructed at Nanjing, Nantong, Zhangjiagang, and Zhenjiang. The Chinese plan to build 30 new berths on the river below Nanjing, in part to relieve the pressure on Shanghai. In November 1982, the Ministry of Communications announced it will soon open Nantong and Zhangjiagang to foreign ships.

Farther upriver, the port capacity of Wuhan has been doubled over the past few years. In 1980, 13.6 million tons of cargo moved through Wuhan, more than the volume handled at most coastal ports. Wuhan is also likely to begin limited container operations. Wuhan authorities recently acquired seven ships, ranging from 3,000 to 5,000 dwt, to operate a direct shipping service to Hong Kong and Japan. Some containers could be moved by this service. The expansion of the port and the acquisition of ships for foreign trade point toward Wuhan's becoming the major shipping outlet for central China, thereby reducing the need for transshipment through Shanghai.

Major Areas of Expansion

Over the past decade, construction and development efforts have centered on improving the flow of specialized cargoes and bulk commodities. Containerization, a fairly recent development at Chinese ports, has been concentrated at Huangpu, Shanghai, and Xingang. Although bulk handling facilities for many commodities are deficient, considerable progress has been made in coal-, oil-, and grain-handling facilities. Six major coal ports—Huangpu, Lianyungang, Qingdao, Qinhuangdao, Shanghai, and Yantai—now have automatic loaders and conveyor systems. Specialized facilities for handling bulk oil have been installed at Dalian, Qingdao, Qinhuangdao, Shanghai, and Zhanjiang. Bulk grain-handling facilities have been mechanized at Dalian, Huangpu, and Shanghai. 25X1

Containerization 25X1

Although international-size containers were used at Huangpu, Shanghai, and Xingang as early as 1972, container traffic grew very slowly because pier-side handling of containers remained heavily dependent on shipboard gear through the 1970s. Containers were also packed and unpacked within the port areas—a practice that reduces the economic advantage of containerization—because China lacked an adequate inland distribution system. Chinese officials cited the poor condition of their roads and the inability of the railroads to handle the larger containers as factors hindering the rapid development of inland container service. In June 1979, Chinese officials noted that although China still would not invest in containerization, the state would be willing to supply space and labor if foreign carriers provided equipment and management for container operations. By late 1979 this policy was reversed, and China began constructing container docks at Huangpu, Shanghai, and Xingang. 25X1 25X1

Container operations have expanded rapidly during the last three years (see table 3). Since 1979 the number of 20-foot equivalent units (TEUs) moving

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Table 3
China's International Container-Handling Volume

	Number of Containers (TEUs) [a]	Total Metric Tons
1972	10,000	NA
1979	32,806	165,811
1980	64,300	388,000
1981	107,000	687,000
1982	160,000 [b]	1,040,000 [b]
1985	1,000,000 [b]	6,500,000 [b]

[a] For accounting purposes, containers usually are reported in 20-foot equivalents (TEUs) derived by multiplying the total number of containers by their length in feet and dividing by 20.
[b] Estimate.

through Chinese ports has increased nearly 400 percent, according to trade papers. By 1985, the Chinese estimate that their ports will be able to move upward of 1 million TEUs, largely because of World Bank funds used to construct seven new container berths. Although this will represent a significant increase in China's container traffic, it is low compared to US ports. The Port Authority of New York and New Jersey alone now handles nearly twice the total TEU capacity planned for all of China's ports in 1985.

China's first dedicated container berth with associated shore-based equipment capable of handling 100,000 containers a year became operational at Xingang in late 1981. The addition of three more container berths at Xingang will raise capacity to 250,000 units per year by 1985. Shanghai and Huangpu, although lacking an exclusive container area with gantry cranes, handled 50,000 and 16,000 TEUs respectively in 1981, using ships' gear. Pairs of container berths now under construction at these two ports will greatly increase container-handling capacity. By 1985, Shanghai is scheduled to have a yearly capacity of 250,000 TEUs. Huangpu's capacity will be 206,000 units. We expect that container operations at Dalian, Fuzhou, Guangzhou, and Qingdao will remain dependent on shipboard gear for transferring containers for several years because no plans have been announced for expanding container facilities at these ports. 25X1

China is beginning to develop other facilities to support greater use of containers. Instead of being loaded on the decks of China's conventional freighters, most containers are now carried by a growing number of specialized containerships. Late in the summer of 1982, China took delivery of the first of six containerships, which are being constructed in West German shipyards. Chinese container routes span the globe, with the most recent addition being a new service between Xingang and the United States. Three container factories—established through joint ventures with American, Japanese, and Danish companies—are already producing international-size containers for the world market, and more factories are being planned. Improved storage and handling facilities are speeding up turnaround time for foreign containerships at Chinese ports, but this is still inferior to the day or two it takes to turn around at the world's more modern ports. A *Journal of Commerce* article in late June 1982 reported that turnaround time now was about two weeks compared with the past, when containerships often remained in port for two to three months. 25X1 25X1

The Chinese have not yet attempted to develop key inland container terminals and a transportation infrastructure for handling international containers. Although the 1981 test of landbridge service for marine containers from Xingang to the Soviet Trans-Siberian railroad was successful, China's inland distribution system cannot handle a large volume of containers. Nor is the system being upgraded for the inland movement of international containers. Given the lead-time needed to develop a distribution network, we believe China will continue to pack and unpack international containers within port areas for several years. Similarly, we expect that the Chinese will continue expanding the use of the 1-, 3-, and 5-ton

containers now in domestic service before attempting to develop an inland network for 20-, 30-, and 40-foot international containers.[3]

Coal Facilities

To transport larger volumes of coal associated with policies to expand output, particularly in northern, eastern, and southwestern China, planners have given priority to doubling the coal-handling capacity at Chinese ports by 1985. Newly developed ports and renovated coal facilities are to have larger and more numerous berths, increased water depths, and more efficient coal-loading equipment by the mid-1980s. Because Japan anticipates a long-term increase in Chinese coal imports, it is helping both to expand Qinhuangdao—China's principal coal port—and to develop a new port, Shijiusuo, which will become China's second leading coal port.

The Ministry of Coal plans to increase coal production from the 620 million tons mined in 1981 to more than 700 million by 1985 (see table 4). Of this volume, the deputy general manager of China National Coal Import and Export Corporation says that 20 million tons—three times the current level—will be available for export. Half of China's exports are committed to Japan under a long-term trade agreement. We believe, however, that because most of the planned increases in China's rail and port capacity will be needed for domestic transshipment, China will have a coal export potential of only about 15 million tons.

Nearly all of China's ports—both coastal and river—are being expanded to handle increased volumes of goods and more diversified cargoes, and China probably will be able to more than double its current coal-handling capacity. In our view, however, the demands on the ports created by the increasing volume and variety of overall foreign trade will counter China's efforts to increase coal transshipments through these ports. Transport networks serving these port complexes will continue to be hard pressed to keep pace with the growth in overall foreign trade.

[3] Chinese containers are little more than wooden boxes, whereas 20-, 30-, and 40-foot international containers hold 20, 25, and 30 metric tons, respectively

Table 4 *Million metric tons*
China's Coal Production and Exports 1980-82, 1985

	1980	1981	1982	1985
Coal Production	620.1	620.0	635.0 [a]	700.0 [a]
Coal Exports				
Total	**6.3**	**6.6**	**7.0** [a]	**15.0** [a]
To Japan	2.1	2.7	3.7 [b]	8.0 [a]
Exports as a percent of production	1.0	1.1	1.1	2.1

[a] Estimated.
[b] Planned for under Sino-Japanese Long-Term Trade Agreement.

Qinhuangdao is being enlarged and improved to increase both domestic and export transshipments. A two-phase expansion program will raise the port's coal-handling capacity from 15 million tons in 1981 to around 45 million tons by 1985. Coal berths, now limited to 25,000-ton vessels, will be able to accommodate 50,000-ton bulk carriers. The first phase of construction, now nearing completion, will raise the port's annual coal-handling capacity to about 25 million tons. A modern coal-loading conveyor system with a reported loading capacity of 5,000 tons per hour is being installed during this phase.[4]

The new Shijiusuo port is scheduled for completion in 1985. It will have two coal berths—one with a capacity of 100,000 tons and one of 50,000 tons. When fully operational, the coal facility reportedly will have an annual handling capacity of 15 million tons. Shijiusuo probably will become more heavily involved in coal exports than in transshipments of domestic coal. China's only other facility that can handle a 100,000-ton coal carrier is the coal pier serving the Baoshan Steel Complex.

[4] For comparison, the Curtis Bay coal facility at Baltimore is rated at 6,000 tons per hour, the C & O facility at Norfolk normally operates at 7,200 tons per hour, and a couple of Great Lakes coal facilities have a rating of 11,000 tons per hour.

The Chinese also are improving coal-handling facilities at the north China ports of Lianyungang, Qingdao, and Yantai. The Chinese press reported that a coal wharf with two berths—a 35,000- and a 16,000-ton class—is being constructed at Lianyungang, which currently can handle around 4 million tons annually. At Qingdao, double tracking on the incoming rail line and construction of a coal wharf for 50,000-dwt vessels will assist in expanding the port's coal-handling capacity. Yantai, with a mechanized coal-loading wharf, is adding new wharves, but these may not necessarily be used for coal. Currently, these three ports primarily handle domestic transshipments of coal, with only a small percentage being exported.

In south China, a coal-handling wharf is under construction at Zhanjiang port. Scheduled for completion in 1985, the wharf will have a 2-million-ton annual capacity and will be able to accommodate 50,000-dwt vessels. It is highly unlikely that any coal will be shipped before the mid-to-late 1980s from the newly opened Fangcheng port, as that port currently lacks rail service

Domestic coal-handling facilities also are being expanded and modernized at Chang Jiang ports. The Nanjing and Wuhu coal facilities are being expanded to handle a greater volume of transshipments of Anhui and Jiangsu coal. Construction efforts at Wuhu are expected to raise annual coal capacity to 6 million tons by 1985. Farther upriver, daily loading capacity at the Wuhan coal wharves was nearly doubled to 370,000 tons in 1980, according to the Chinese press. To reduce the need for transshipments of coal through Shanghai, a 10,000-dwt-class coal berth was opened in late 1980 at Nantong. Shanghai handles about 29 million tons of incoming coal a year; most of this is destined for its two coal-fired electric power stations.

Oil Transfer Facilities

The Chinese have developed specialized bulk oil-handling facilities at Dalian, Qinhuangdao, Qingdao, Shanghai, and Zhangjiang to remedy the problems of ship congestion that occurred in the early 1970s. Although China built and put into operation several new oil berths by 1978, no new facilities have since been added. In fact, imagery shows that the Chinese have suspended construction of two new POL berths at Qinhuangdao. We suspect that the Chinese have switched oil-related construction funds to projects that will increase the ports' coal-handling capacity. Chinese oilfield production has not lived up to earlier expectations, and imagery shows that China is not fully utilizing its 26 oil-transfer berths. With Chinese oil output down about 4 percent from the 1980 peak and with little prospect of any significant payoff from offshore exploration activities before the late 1980s, we believe that China will forgo additional expansion of oil berths in favor of meeting more immediate needs until at least the mid-1980s.

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Chinese oil-export operations center around the three northern ports of Dalian, Qinhuangdao, and Qingdao. Dalian, where a 100,000-ton tanker can be turned around in 24 to 36 hours, is China's premier oil-export facility, with an annual design capacity of 15 million metric tons (300,000 barrels per day) of crude. Both Qinhuangdao and Qingdao can handle 50,000-ton tankers and have a yearly capacity of about 10 million tons (200,000 b/d). China imports only a limited amount of oil, generally from the Middle East, and this oil is unloaded in the south at Zhanjiang, where it is piped to the Maoming refinery.

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Oil berths in south and east China are primarily used to transship domestic crude to regional petrochemical plants. Shanghai's petrochemical wharf has at least four berths capable of receiving 10,000- to 25,000-dwt tankers. Nanjing, the largest oil-transfer facility on the Chang Jiang, has six oil docks with a total yearly capacity of 15 million tons. Crude oil from the Shengli oilfield arrives via a 1,000-kilometer pipeline and then is transferred via tankers to refineries along the Chang Jiang. *China Reconstructs* reports that the Nanjiang complex can handle six tankers at a time, the largest being a 25,000 tonner that can be loaded in 15 hours.

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Grain Berths

Grain-handling capacities have not improved much since the initial installation of automated grain elevators at Dalian, Huangpu, and Shanghai in the mid-to-late 1970s. ships can still experience delays of up to three months in

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unloading grain at Chinese ports. Since 1972, the year before China decided to expand port operations, total grain transshipments have increased 150 percent, with import volume rising nearly 225 percent. Imports of wheat and corn constitute most of the volume handled, and exports—chiefly rice and soybeans—account for less than one-tenth of total volume. We estimate the annual grain-handling capacity of Chinese ports at around 18 million tons—about 2.5 million more than expected grain trade volume in 1982 and enough to handle the grain trade levels that we project for 1985 (see table 5).

We believe that an inadequate inland distribution system, poor scheduling of ship arrivals, an inability to handle larger ships, and the overall growth in foreign trade are responsible for the slow turnaround of grain ships at Chinese ports. A Ministry of Communications official claims that part of China's grain-handling problem arises from the US-China maritime agreement. The agreement stipulates that one-third of US grain exports to China—an estimated total of 8 million tons of US grain was shipped in 1982—be carried on US ships. Chinese officials argue that their shallow ports limit grain ships to the 20,000- to 35,000-dwt class—much smaller than the average grain carrier in the US fleet.

Despite a shortage of elevators, grain can now be handled at most major ports using a combination of dockside and shipboard cranes, hoppers, and mobile conveyors. Grain can now be unloaded directly on barges, railcars, or trucks for inland movement or can be bagged for temporary storage. For example, Xingang has two dedicated grain berths, capable of handling 35,000-dwt ships, where grain can be unloaded directly into railcars at a rate of 350 to 500 tons per hour. However, this type of operation requires the immediate availability of inland transport, and past reporting indicates that there have been frequent delays because the necessary rail and truck carriers were unavailable.

Even those Chinese ports with automated elevator storage cannot match the efficiency of grain ports in other countries. For example, Shanghai's grain wharf, with its six pneumatic unloaders can remove 500 tons per hour from ships up to 15,000 dwt, whereas some US facilities can move 3,000 tons per hour. Ships

Table 5 *Million metric tons*
China's Grain Imports and Exports

	Total	Imports	Exports
1972	6.16	4.64	1.52
1973	10.48	7.90	2.58
1977	8.38	7.30	1.08
1978	10.95	9.55	1.40
1979	12.80	11.42	1.38
1980	15.67	14.48	1.19
1981	14.75	13.95	0.80
1982	15.50 [a]	15.00 [a]	0.50 [a]
1985	17.50 [a]	16.50 [a]	1.00 [a]

[a] Estimate.

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between 20,000 and 30,000 dwt can be unloaded at a slower rate after lightering, and ships larger than 20,000 dwt also must be swung around and redocked because the wharf is short. The Luhuashan offshore facility—a 100,000-dwt ship anchored 75 nautical miles downriver from Shanghai—can unload grain carriers of up to 100,000 dwt at a rate of 400 tons of grain an hour by transferring to smaller ships or oceangoing barges.

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Although we estimate that the new facility can store up to 35,000 metric tons, it will do little to reduce congestion because it can only berth ships smaller than those at the old grain wharf.

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Dalian's elevator, with a 40,000-metric-ton capacity, chiefly handles soybeans for export from northeastern China, while clamshell cranes load imported grain into railcars. The 30,000-metric-ton elevator at Huangpu in southern China has one pneumatic sucker rated at 300 metric tons per hour that can be supplemented by a gantry crane moving 100 metric tons per hour.

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In late 1981 Huangpu's elevator and associated rail tracks were heavily

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damaged by an apparent grain-dust explosion. Because grain still could be lightered—albeit more slowly—at the facility or in midstream, the extent that shipments were reduced through Huangpu is unknown.

Other Bulk Handling Facilities

Despite improvements over the past decade, Chinese ports have been unable to handle the rapid increase in some bulk commodities. For example, fertilizer imports have increased steadily since 1972, but bulk fertilizer-handling facilities have not kept pace. Although many of the modernization projects called for in 1972 became operational between 1977 and 1980, the unloading of fertilizer still is a laborious process.

Because of the shortage of handling and bagging facilities, some bulk fertilizer imports arrive in Japan, where they are unloaded, bagged, and reloaded for shipment to Chinese ports. Shanghai—China's busiest port—has only one fertilizer pier, at which only 1,000 metric tons can be bagged per day. Moreover, no further improvements are planned for the facility.

Although China's merchant fleet has acquired modern timber carriers, improvements to port or inland distribution networks have been inadequate to handle increased timber imports. Nor is any relief in sight. The Chinese media only recently announced plans for constructing two 25,000-ton-class timber berths at Lianyungang by 1990. Timber imports increased by some 50 percent between 1978 and 1980 and have severely taxed timber-handling facilities.

Factors Affecting Port Expansion

Poor management at the ports, shallow drafts at many harbors, and inland transport difficulties also affect port expansion. Chinese media report traffic at the major ports running 16 percent above designed capacity. On the other hand, one port official claimed that berth utilization at major ports in 1981 was 80 to 90 percent. Despite the opening of new facilities, turnaround time in 1978 exceeded 1972's average of 15.4 days by three days, according to the *Economic Reporter*. In 1980, the Chinese press reported that up to $200 million was paid out in demurrage fees to foreign carriers because of delays.

Poor scheduling of shipping, ongoing construction, and inadequate storage facilities also contributed to port congestion. The Chinese press has been reporting improved turnaround times at a number of ports, but we believe much of the time saved is being lost by ships waiting for berthing space. Earlier in 1982, heavy port congestion caused delays of up to three months for some of the 350-odd ships that daily were awaiting entry into Chinese ports. Imports of bulk commodities—especially grain and fertilizer—were particularly hard hit. In December 1981, *Containerization International* reported that Chinese container facilities—designed to speed up cargo movements—were frustrating foreign carriers by taking a week or more to load 300 to 400 containers on board ship.

Draft restrictions limit access of larger ships to Chinese ports. Most ports are located at river mouths, where deposits of clay, silt, and sand necessitate constant dredging to maintain minimum channel and port clearance. China's dredging fleet, one of the world's most modern, maintains a minimum clearance for 20,000-dwt ships at most major ports. We believe, however, that future dredging will do little more than maintain current draft. For example, about half of Shanghai's berths cannot handle ships over 10,000 dwt, and there is little hope for significant improvement. In the future, China will probably achieve the greatest capacity increases by developing deepwater ports at new coastal locations, such as the 100,000-dwt berth at Shijiusuo.

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Shifts in transport demands caused by regional changes in production also affect port areas. The recent move toward development of larger, more economical coal mines in northern China and away from coal production in southern China will ultimately increase demands for coal transshipments from north to south. Any increase in coal volume—already accounting for nearly 40 percent of rail volume—would reduce space available for other commodities.

Rail freight in eastern China accounts for more than 85 percent of China's total rail transport volume. In late 1979, the Minister of Railways stated that railway construction would be concentrated on upgrading high-density lines in the east, with emphasis on moving coal and improving rail service to ports. Many of the improvements, however, will not be completed until 1985, when a number of port projects also are due for completion. Thus, we doubt that the added rail capacity will be able to satisfy both the increased demand created by port expansion and the increased demands resulting from growth in the industrial sector.

China's principal highway net also is concentrated in the industrialized east, where roads are still mostly used for short-haul freight or as feeders to the rail or water networks. There are few direct routes, and there is no coordinated national highway system. Some short-distance access roads have been built in major cities, but it will be at least the late 1980s before any kind of national arterial highway system begins to take shape. Highway improvements traditionally have had a low priority compared with other transport needs, probably because—as a Vice Minister of Railways pointed out—every dollar invested in rolling stock requires $5 in highway investment to get the same increase in capacity. Moreover, 85 percent of China's highway transport trucks belong to organizations independent of the Ministry of Communications. These organizations carry only their own freight; thus, many trucks run empty nearly half the time.

The low utilization and poor quality of highways supporting ports places an additional burden on railroads. Now one-fourth of all Chinese rail freight is moved less than 100 kilometers, whereas such short runs would be handled by trucks in more developed countries. The Chinese, however, have announced no plans for the trucking industry, and we believe highway development will continue to lag and will do very little to reduce port congestion.

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Prospects: Impact on US and Other Foreign Carriers

China will continue modernizing ports by constructing deepwater berths and expanding cargo-handling capacity. However, because of congestion, some foreign shipping lines, including those of the United States, are hesitant to use Chinese ports. Shallow water at many of China's ports discourages calls by those foreign lines operating larger ships. US container and grain carriers are particularly affected because the average draft of their ships is too great for China's ports.

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The two-year-old Maritime Transport Agreement between the United States and China was designed to increase bilateral trade by opening ports to each other's merchant shipping. Under the agreement, each country's ships are to have an equal opportunity to participate in the trade generated between the two countries. US carriers, however, are having difficulty achieving the minimum one-third share of cargo called for in the agreement. The Chinese argue that their shallow ports and the large size of US ships are prime reasons for the US carriers' failure to obtain a larger share. Moreover, China's practices of assigning individual carriers to specific ports prevents the foreign carrier from shopping around for cargo at other ports. Although this practice probably could be changed rather quickly through negotiations, improving the physical characteristics of Chinese ports will take much longer.

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Congestion problems are expected to continue at China's ports for most of the 1980s. Some port improvements scheduled for completion in the mid-1980s will accelerate port operations—especially at container and coal facilities. However, completion of all of the port construction now planned and provision of an adequate infrastructure supporting China's ports will not be achieved in this decade.

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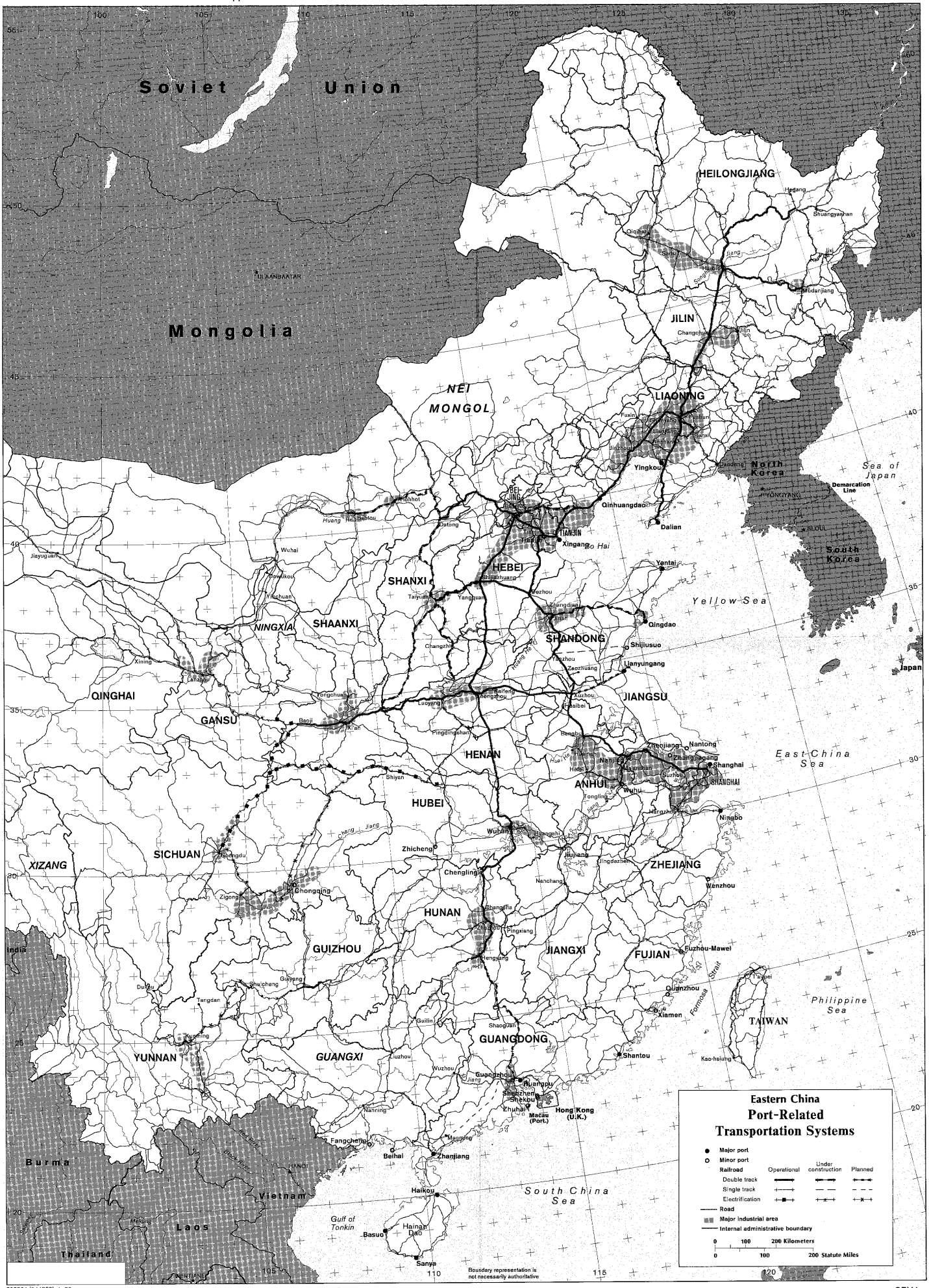

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